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Original article

Postoperative discomfort after outpatient anterior cruciate ligament reconstruction: A prospective comparative study



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ABSTRACT

Introduction: The principal objective of the present study was to compare rates of postoperative discomfort after anterior cruciate ligament (ACL) reconstruction between inpatient (In) and outpatient (Out) management.

Patients and method: A single-surgeon non-randomized prospective comparative study included patients undergoing primary surgery for isolated ACL tear by short hamstring graft in 2012–13. The Out group comprised patients eligible for and consenting to outpatient surgery and the In group, those not eligible or not consenting. The principal assessment criterion was onset of at least 1 symptom of postoperative discomfort (SPD): anxiety, nausea and vomiting, malaise, vertigo or stomach pain, between postoperative days 0 and 3. Secondary assessment criteria were difficulty in getting to sleep, getting up during the night, regular walking or going out, number of episodes of knee pain and waking because of pain. All criteria were assessed on-line by the patient.

Results: One hundred and thirty-three patients filled out the questionnaire, 70 in the Out group and 63 in the In group; 42 females, 91 males; mean age, 30 ± 9 years. Between D0 and D3, the proportion of patients with ≥ 1 SPD was comparable between groups (Out 37% vs In 41%, $P=0.62$). Out-group patients had significantly less difficulty sleeping the first postoperative night ($P=0.01$), got up significantly more often during the first night after surgery ($P<0.0001$), more often walked regularly on day 1 ($P=0.03$), and were significantly less often woken by pain during the first night ($P=0.003$). Risk factors for SPD were female gender ($OR=4.8 \pm 1.9$) and postoperative complications ($OR=3.8 \pm 2.5$).

Conclusion: Patients undergoing ACL reconstruction on an outpatient basis did not show more symptoms of postoperative discomfort than those managed as conventional inpatients.

Level of evidence: IV; prospective comparative study.

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1. Introduction

Symptoms of postoperative discomfort (SPD) are disagreeable sensations, of varying intensity but usually not severe. Some may be specific to a particular surgical procedure, but many are general, liable to occur during early postoperative course in any surgery patient. In a prospective study of 1071 patients undergoing outpatient surgery, including 117 in orthopedic surgery, the main post-discharge SPDs were incision site pain (26.9%), headache (11.6%) and somnolence (11.5%). In terms of frequency of SPDs, orthopedic surgery showed the most incision site pain (53.9%),

the second most nausea and vomiting (11.2%) and the third most somnolence (7.7%) and vertigo (6.8%) [1].

A recent literature review by the French health authority (Haute Autorité de santé: HAS) highlighted the fact that no comparative studies have as yet assessed SPD onset according to in- or outpatient management [2]. The question needs examining, as the rate of outpatient surgery is continually increasing, including in orthopedics, and may be compromised by such symptoms, causing patient dissatisfaction. Identifying SPDs and their risk factors could also improve patient information and management.

The princeps study of the feasibility of outpatient surgery in anterior cruciate ligament (ACL) reconstruction reported no severe adverse events and demonstrated that, in a selected population, risks were comparable to those of conventional inpatient management, with no significant difference in postoperative pain or satisfaction [3].

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The principal objective of the present second study was to compare SPD onset rates after ACL reconstruction between in- and outpatient management. The study hypothesis was that SPD is not greater in outpatient than in inpatient surgery.

2. Material and method

A single-surgeon non-randomized prospective comparative study conducted in 2012–13 included all patients undergoing primary arthroscopic ACL reconstruction. Two groups were constituted: an outpatient group (Out) comprising patients eligible for and consenting to outpatient surgery, and an inpatient group (In) comprising those not eligible or not consenting. An institutional review board approved the study; patients provided informed consent; and the database was registered with the French data protection commission (Commission nationale de l'informatique et des libertés: CNIL).

A detailed clinical pathway was drawn up for outpatients, following health authority guidelines [2]. Surgery was performed under arthroscopy, using a short hamstring graft (TLS®) [4]. Anesthesia and discharge analgesia protocols were standardized [3]. Surgery was performed under either general (GA) or spinal (SA) anesthesia according to the patient's preference. Ultrasound-guided crural block using 20 mL 0.475% naropeine could be administered in the induction room in either case. At discharge, 48–72 hours' analgesia was systematically prescribed, associating paracetamol to naproxen in absence of contraindications for NSAIDs, and an anti-gastric secretory agent. In case of residual pain, the paracetamol tablet could be replaced by a tablet of tramadol-paracetamol or paracetamol-codeine. Morphine could be provided for inpatients. The evening after surgery, the outpatients were discharged home with a knee protection brace and crutches, accompanied by a third party in a motor vehicle. Inpatients were systematically raised from bed once by a physiotherapist.

2.1. Assessment criteria

The principal assessment criterion was onset of at least 1 SPD (anxiety, nausea and vomiting, malaise, vertigo or stomach pain) between D0 (day of surgery) and D3 (postoperative day 3). Secondary assessment criteria were waking because of pain during the night after surgery, number of episodes of knee pain between D0 and D3, regular walking or going out between D1 and D3, getting up during the night between D0 and D3 and difficulty getting to sleep between D0 and D3. All self-assessment criteria were entered on-line by the patient on the websurvey.fr® site in response to an e-mail containing a link to the site sent on D4 (see electronic Appendix A).

2.2. Statistical analysis

Depending on distribution normality, quantitative variables were assessed on Student-*t* or Mann-Whitney tests and qualitative variables on Chi² or Fisher exact test. Risk factors for onset of ≥ 1 SPD were explored on uni- and multivariate analysis by logistic regression; variables with significance level < 0.25 on univariate analysis were entered in the multivariate analysis. The significance threshold was set at $P < 0.05$.

3. Results

One hundred and thirty-three of the 138 patients included (96.4%) responded to the assessment questionnaire: 70 Out and 63 In. The In group comprised patients refusing outpatient treatment (27/63), living alone or too far away (22/63) or excluded on medical grounds (14/63: 6 with complex knees, 3 with history of phlebitis, 2 with coagulation disorder, 2 with neurologic pathology and 1 with history of septicemia). The two groups were comparable for age (29 ± 8 years in the Out group and 31 ± 10 years in the In group; $P = 0.29$), gender (21 female/49 male in the Out group and 21 female/42 male in the In group; $P = 0.71$), and accident-to-surgery interval (in months) (respectively, 16.9 ± 23.9 and 14.4 ± 31.1 ;

Table 1
Symptoms of discomfort experienced at least once between D0 and D3 in the two groups.

Symptoms of discomfort at least once between D0 and D3	Out group ^a (n = 70)	In group ^b (n = 63)	P
Vertigo	12 (17.1%)	17 (27%)	0.17
Nausea/vomiting	8 (11.4%)	10 (15.9%)	0.45
Malaise	7 (10%)	5 (7.9%)	0.67
Stomach ache	7 (10%)	3 (4.8%)	0.25
Anxiety	5 (7.1%)	4 (6.3%)	0.85

^a Outpatients.

^b Inpatients.

Table 2
Secondary assessment criteria.

Secondary assessment criteria	Out group ^a (n = 70)	In group ^b (n = 63)	P
Waking the night after surgery due to pain	17 (24%)	31 (49%)	0.003 (S)
Number of episodes of knee pain from D0 to D3	3 \pm 2	3.2 \pm 2.5	0.59 (NS)
Regular walking or going out on D1	22 (31%)	10 (16%)	0.03 (S)
Regular walking or going out on D2	38.6%	34.9%	0.66 (NS)
Regular walking or going out on D3	55.7%	52.4%	0.70 (NS)
Getting up in the night of D0	50 (71%)	12 (19%)	<0.0001 (S)
Getting up in the night of D1	87.1%	85.7%	0.81 (NS)
Getting up in the night of D2	91.4%	96.8%	0.28 (NS)
Getting up in the night of D3	94.3%	98.4%	0.36 (NS)
Difficulty getting to sleep the night of D0	20 (29%)	31 (49%)	0.01 (S)
Difficulty getting to sleep the night of D1	37.1%	47.6%	0.22 (NS)
Difficulty getting to sleep the night of D2	44.3%	38.1%	0.46 (NS)
Difficulty getting to sleep the night of D3	35.7%	34.9%	0.92 (NS)

S: statistically significant; NS: statistically non-significant.

^a Outpatients.

^b Inpatients.

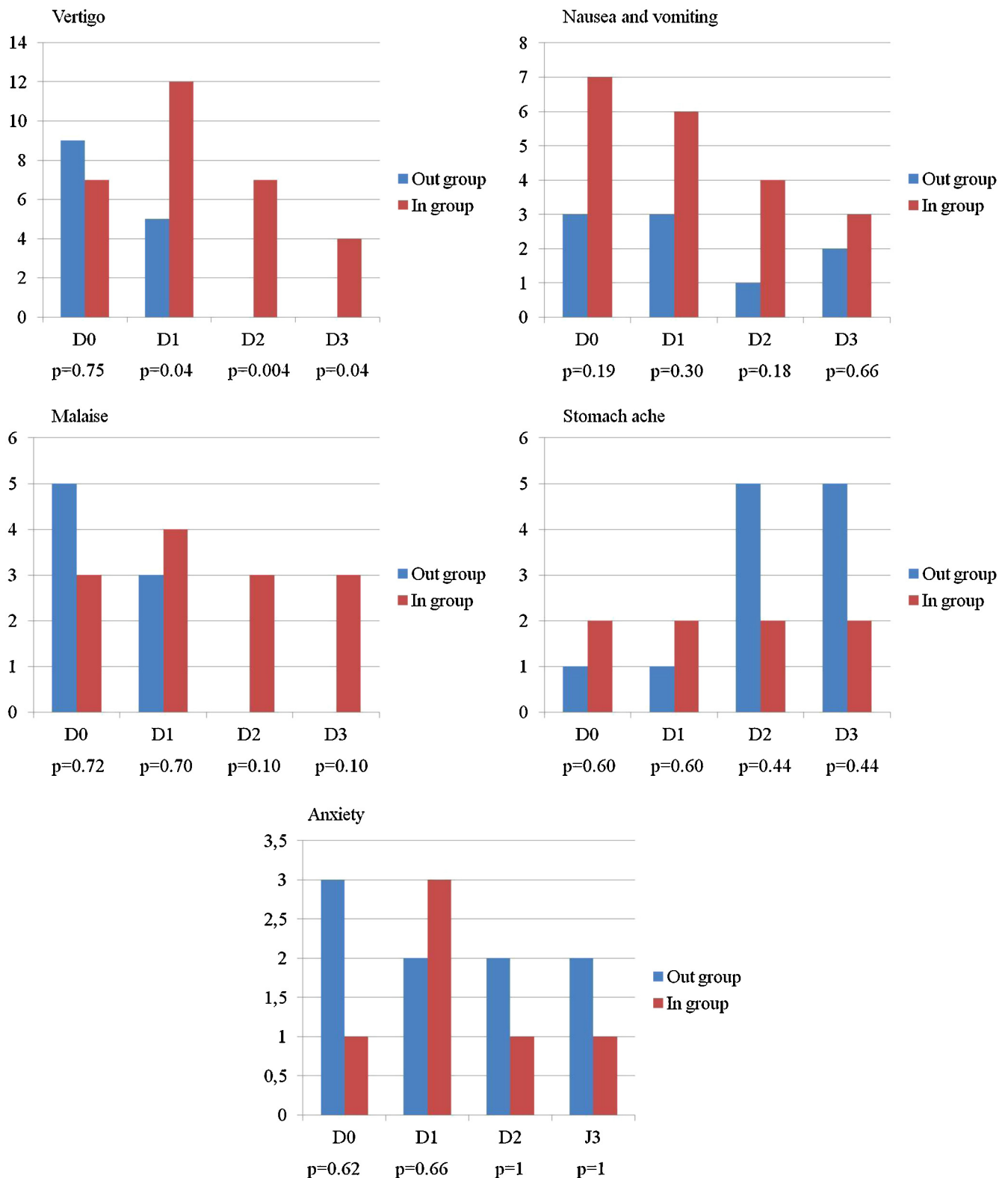


Fig. 1. Evolution of the various symptoms of postoperative discomfort from D0 to D3 in the two groups.

$P=0.59$). There was no significant difference in type of anesthesia between the Out group (GA 16/70, 22.8%; SA 54/70, 77.1%) and the In group (GA 22/63, 34.9%; SA 41/63, 65.1%) ($P=0.12$). Crural block was performed in 47/70 patients of the Out group and 44/63 of the In group ($P=0.73$). There was no significant difference in associated procedures: partial meniscectomy, meniscal repair or

microfracture (15/70, 21.4% vs 10/63, 15.9%; $P=0.41$). Six early postoperative complications occurred in each group: 10 diffuse hematomas without hemarthrosis (5 In, 5 Out), 1 case of bleeding within the dressing (an outpatient, not discharged) and 1 phlebitis (In). Mean hospital stay in the In group was 2.7 ± 0.8 days [3].

Most patients took analgesics during the first 4 days, with a significantly more frequent consumption in the In group on D1 (57/63 vs 47/70; $P=0.001$). In the In group, 36/63 patients (57.1%) used morphine in the evening of surgery, and 18/63 (28.6%) on D1, 7/63 (11.1%) on D2 and 5/63 (7.9%) on D3. Out-group patients significantly more often took paracetamol-codeine in the evening after surgery ($P=0.0001$) and naproxen in the evening after surgery ($P=0.02$), on D2 ($P=0.005$) and D3 ($P=0.02$).

Between D0 and D3 SPD rates were comparable between groups: 26/70 (37%) with ≥ 1 SPD in the Out group and 26/63 (41%) in the In group ($P=0.62$). Taking all patients together, SPDs in decreasing order of frequency were: vertigo (22%), nausea and vomiting (14%), malaise (9%), stomach ache (8%) and anxiety (7%), without significant difference between groups (Table 1). Day-by-day analysis showed that outpatients had significantly less vertigo on D1, D2 and D3 (Fig. 1), had less difficulty getting to sleep the first night after surgery ($P=0.01$), got up significantly more often during the first night after surgery ($P<0.0001$), walked regularly or went out significantly more often on D1 ($P=0.03$), and were woken by pain significantly less often the first night ($P=0.003$) (Table 2).

Possible risk factors for ≥ 1 SPD were tested. Univariate analysis identified age > 26 years ($P=0.03$), female gender ($P<0.0001$) and early postoperative complications ($P=0.15$). Type of management (in- or outpatient), type of anesthesia (general or local) and use of crural block were not significant factors ($P>0.25$). The only risk factors remaining on multivariate analysis were female gender (odds ratio (OR), 4.8 ± 1.9 ; 95% CI, 2.2–10.7) and postoperative complications (OR, 3.8 ± 2.5 ; 95% CI, 1.1–13.5).

4. Discussion

This comparative study in a large continuous single-surgeon series found outpatient ACL reconstruction not to be associated with greater postoperative discomfort than inpatient management. The most frequent SPD was vertigo, followed by nausea and vomiting and malaise.

Symptom frequencies were in agreement with the literature, for surgery in general. A 2002 literature review analyzed 31 observational studies in outpatient surgery [5]. Mean frequency over a period of 1 to 7 days was 18% (range, 7–41%) for vertigo and 17% (0–55%) for nausea; in the present outpatient group, over a period of 4 consecutive days, the rates were respectively 17.1% and 11.4%. A study of outpatient knee arthroscopy [6] reported a rate of 11.5% for nausea and vomiting during the first 3 postoperative days. These figures are comparable to those of Chung et al. for outpatient orthopedic surgery patients contacted by telephone 24 hours after discharge [1].

In a randomized study, Krywulak et al. compared 21 ACL reconstruction patients managed on an inpatient basis and 19 on an outpatient basis [7]: satisfaction was significantly greater in the outpatient group, with no significant difference in pain, nausea, complications or readmission. Kao et al. reported 37 ACL reconstruction patients, 25 managed on an inpatient and 12 on an outpatient basis, and found comparable results for postoperative pain and function [8]; costs comparison showed 58% savings with outpatient surgery.

SPDs are frequent and often persistent. Mattila et al. [9] reported more than 86% of patients with at least 1 symptom at D0, 49% up to D3 and 24% up to D7. The most frequently reported risk factors are general anesthesia, female gender, young age and long surgery time [1,9]. In the present study, the only identified risk factors after adjustment were female gender and early postoperative complications.

Patients in the Out group got up during the first night after surgery and walked regularly or went out on D1 significantly more

often than In group patients. The difference faded over the following days: normal function seems to be recovered more quickly after outpatient surgery, probably due to a feeling of confidence on being discharged home with just a brace and crutches.

There was no significant difference in the number of times the patient had knee pain, but Out-group patients were significantly less often wakened by pain during the first night; going to sleep in a familiar, reassuring world probably explains this. The principles study [3] also assessed mean pain intensity on a 0–10 scale, and found no significant difference between groups (2.9 ± 1.8 for outpatients and 3.4 ± 2.3 for inpatients; $P=0.21$).

The main limitation of the present study was the absence of randomization. The strong points were the comparative design and exhaustiveness of data collection. Data were directly entered on-line by the patient, and the response rate was high: 96.4%, whereas the mean rate in most published studies is 62% [10].

5. Conclusion

Patients undergoing ACL reconstruction on an outpatient basis did not experience more symptoms of postoperative discomfort than those managed on a conventional inpatient basis. They got to sleep more easily the first night after surgery, got up more often, and walked more regularly the following day. Risk factors for onset of SPD are age greater than 26 years, female gender and postoperative complications.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the on-line version, at doi:10.1016/j.otsr.2014.07.036.

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